

Lesson 2: Find the Shape

Lesson Topic _____ **Grades** _____

Using ordered pairs to identify, locate, and plot points on the coordinate plane.

4–5

Lesson Length _____

40 minutes

NCTM Standards Addressed _____

- Describe location and movement using common language and geometric vocabulary
- Make and use coordinate systems to specify locations and to describe paths

PA Standards Addressed _____

- Locate and identify points on a coordinate system

Student Objectives _____

Students will:

- identify points on the coordinate plane using ordered pairs
- plot ordered pairs on the coordinate plane
- use properties of shapes to identify polygons such as triangles and quadrilaterals (square, rectangle, parallelogram, trapezoid)

Grouping for Instruction _____

- Whole class for motivation, introduction, summary, and closure.
- Pairs for activities.

Overview of Lesson _____

Students play a game similar to the game *Battleship*. They identify ordered pairs and plot ordered pairs in the first quadrant. (This lesson can be extended to include the entire coordinate plane.)

Background Information

Students should have some familiarity with the first quadrant of the coordinate plane and with identifying and plotting ordered pairs (mastery is not expected). Students should also be familiar with polygons such as triangles and quadrilaterals and their geometric properties.

Materials and Equipment

- Square grid paper
- Colored pencils
- Overhead projector

Lesson 2 Procedure

A. Motivation and introduction

1. Ask students if they have ever played the game *Battleship*. If a student is familiar with the game, have him or her tell the class about the game.
Tell the students that today we are going to play a game similar to *Battleship*.
2. On the overhead projector or on large graph paper draw the first quadrant of the coordinate plane. Have individual students plot a point and then identify the ordered pair. Do this a few times; if no one selects the origin (0,0), then put a point there and ask students to identify the coordinates.
3. On a different graph draw a few polygons such as a triangle, square, rectangle, parallelogram, and isosceles trapezoid. Ask students to identify the shapes and name coordinates of the vertices.

B. Development (including discussion points and feedback)

1. Divide the class into pairs. Instruct students to move their desks so that they are facing each other. In the middle students should make a pile of books so that they cannot see their partner's paper.
2. Distribute to each student a sheet of paper that has a graph of the first quadrant on the upper half of the paper and on the lower half of the paper.
3. Each student will then draw a polygon (triangle, square, rectangle, parallelogram, or isosceles trapezoid) on the top grid. Discuss some of the properties of shapes that might help students identify the shapes.
4. Each student will then try to guess what shape his or her partner drew. To do this students take turns asking whether or not their partner's shape has a point plotted at a specific location (ordered pair). When a student names a point, that point is plotted on bottom grid. If the point is plotted on his partner's grid, then the student should put a dot there; if it is not, then the student should put an "X" at the point. (This allows students to keep track of their guesses.)

5. When a student thinks that he or she knows the partner's shape, he or she should identify the shape and call out all the ordered pairs.
6. Repeat as time allows.

C. Summary and closure

1. Ask students to share some of the strategies that they used to figure out their partner's shape. Encourage them to talk about the properties of shapes that helped them to do this.
2. Have students plot and connect points that either spell out a message (such as “THE END”) or make a picture such as (1,2), (2,3), (3,3), (4,2), (3,1), and (2,1), which makes a hexagon.

D. Assignment

Have students draw a picture on graph paper (first quadrant only) and then identify the coordinates that would be connected to draw the picture

Assessment

Observe the students during the activity to make sure they are playing the game correctly and to see whether or not they are just making random guesses or whether they are actually using their knowledge of ordered pairs and properties of shapes to find their partner's shape.